

Undergraduate Research Symposium May 18, 2018 Mary Gates Hall

Online Proceedings

POSTER SESSION 2

Commons West, Easel 29

1:00 PM to 2:30 PM

Relationship between Prenatal and Perinatal Conditions and IQ Differences in Children with ASD

Isabella Li, Senior, Public Health-Global Health

Mentor: Sara Jane Webb, Psychiatry & Behavioral Sciences, Seattle Children's Research Institute

Mentor: Megha Santhosh, Child Health Behavior and Development, Seattle Children's Research Institute

Autism spectrum disorder (ASD) is one of the fastest growing childhood disorders, becoming a major public health concern. Studies have shown that children with ASD are more likely to be exposed to perinatal complications than typically developing (TD) children. Sex differences have also been shown to affect ASD diagnoses. However, variables that affect severity of ASD are still understudied. Understanding factors that impact ASD severity may assist in establishing methods to identify ASD outcomes, and target children at high risk for worse outcomes with treatment. The study aims to investigate IQ differences in children with ASD on variables including birth weight, gestational age, sex, and birth order. 150 children (75 males and 75 females) aged 6 to 18 years with a confirmed diagnosis of Autism participated in the study. Autism diagnoses of the participants were confirmed via ADOS-2, a clinician-child measure that scores on child's social, repetitive behaviors and communication skills. Parents completed a self-reported demographic questionnaire about family demographics, and the Autism Center of Excellence subject medical history form, a medical interview with information on pregnancy complications and child medical history. All subjects completed the DAS-II evaluation tool that measures the cognitive abilities (IQ) of children on verbal and non-verbal domains. We hypothesize that children with lower IQ levels (full scale IQ < 80) will have lower average birth weight, average smaller gestational ages and a higher number of pregnancy related complications. We also expect that given the higher rate of ASD incidence in boys, within the ASD group, there will be a main effect of sex with more males (n=75) having higher rate of pregnancy complications than females (n=75). Results will help establish a better understanding of other prenatal variables that may be correlated to later severities of ASD, and provide support for treatment targeted at prenatal risk.

POSTER SESSION 2

Commons West, Easel 28

1:00 PM to 2:30 PM

Relationship between Peak Alpha Power and Average Alpha Power in Resting State EEG in Children with Autism Spectrum Disorder

Jeong Moon (Vanessa) Lee, Senior, Psychology

Mentor: Sara Jane Webb, Psychiatry & Behavioral Sciences, Seattle Children's Research Institute

Mentor: Megha Santhosh, Child Health Behavior and Development, Seattle Children's Research Institute

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder involving impairments in social communication and repetitive and restrictive behaviors. Children with ASD are oftentimes diagnosed with cognitive impairment, specifically below average intelligence scores and atypical brain function in relation to early developmental regression. In order to analyze neural activity, Electroencephalogram (EEG) is used to monitor brain activation during certain tasks. EEG is a non-invasive tool that uses scalp electrodes to record neural activity frequency. EEG is divided into frequency bands, including the Alpha band frequency (neural activity between 6 and 12 Hz), which is present during the relaxed awake state of individuals and thought to be related to functional inhibition. Previous EEG studies consistently detected abnormalities in resting state alpha among individuals with ASD when compared to neurotypical counterparts. Findings suggested that reduced resting state alpha power was exhibited in brain regions involved in sensorimotor skills and higher-order cognitive functioning. Although many studies compare the difference between ASD group and neurotypical group, more research is needed to study the alpha power patterns within the ASD group. This study aims to compare EEG peak alpha power and average alpha power between high functioning (NVIQ > 100) and low functioning children with ASD. 100 participants (50 males and 50 females) aged 6-18 participated in the study. All participants met criteria for autism diagnosis on a clinician administered standard interaction, and completed the DAS-II, which measures verbal and non-verbal cognitive abilities. Participants watched calm screen-saver like videos while high density EEG was collected. We hypothesize that the children with ASD and lower functioning will have reduced average alpha power and reduced peak alpha frequency when compared to higher functioning chil-

dren with ASD. The results of this study will provide insight into of differences within children with ASD.

POSTER SESSION 2

Commons West, Easel 27

1:00 PM to 2:30 PM

Relationship between Psychiatric Comorbidities and Autism Severity in Children with Autism Spectrum Disorder

Sydney Elise Stone, Junior, Speech and Hearing Sci (Com Disorders)

Mentor: Sara Jane Webb, Psychiatry & Behavioral Sciences, Seattle Children's Research Institute

Mentor: Megha Santhosh, Child Health Behavior and Development, Seattle Children's Research Institute

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by marked impairments in social skills, communication, and behavioral aspects of typical development. Research has shown that individuals with ASD often present with psychiatric comorbidities such as Depression, Anxiety, Obsessive Compulsive Disorder, Attention Deficit Hyperactivity Disorder and Bipolar Disorder. Comorbidities can have a broad and significant impact on a child's health and wellbeing and such conditions are significantly more prevalent in those with autism than in the general population. This study aims to explore the relationship between psychiatric comorbidities and autism severity in children with ASD. 100 children (males=50, females=50) aged 6-18 participated in the study. All participants met the Autism diagnostic criteria on the ADOS-2, a child-clinician interaction measure that measures child's social, repetitive behaviors and communication skills. Parents completed the Autism Center of Excellence subject medical history form, with information on child medical history. Problem behaviors and low IQ scores in children with ASD may be the symptom of underlying psychiatric comorbidities instead of the autism itself. Due to this, treatment of comorbid medical conditions may result in dramatic improvements in the quality of life of both children with autism and their caregivers. In this study, we expect that children with a higher rate of psychiatric comorbidities will score higher ADOS calibrated severity scores with a higher rate of autism symptoms and will score lower on IQ measures. Results will help establish a better recognition of comorbid medical conditions as critically important issues to address in treatment approaches.